

In this connection I may add that I have had the advantage of observing the march of the disease in three Congo negroes, who, after displaying the usual symptoms noted in such cases, quietly slept themselves to death. Brumpt, in Paris, experimenting on monkeys, succeeded in reproducing the disease in them. While interesting in that they demonstrate the relation between the trypanosome *Castellani* and sleeping sickness, these experiments have so far failed to lead to the discovery of any remedy for the disease.

## THE PATHOLOGY AND TREATMENT OF MORPHINISM.\*

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VERY little if any improvement in the treatment of the narcotic drug addictions has been made during the last half century until within the last few years. The treatment has been practically the same all these years, and has been equally unsuccessful and unchanging.

The teachings of Burkhart have to a great extent moulded professional opinion on this subject, and his gradual reduction method has had the endorsement of most medical writers. This has evidently been given upon theoretical grounds, and not because of success attending its application. This tapering off method appeals to the preconceived notions of both the physician and his patient, but as these notions were based upon a false conception of what was really to be accomplished, those holding them were doomed to disappointment. Treatment by this method has been almost universally a failure. The long siege of almost intolerable suffering which it involves so exhausts the patient, both physically and mentally, that by the time the drug is all withdrawn the patient has no ability to resist the slightest pain, and is so thoroughly exhausted and discouraged that he will return to the use of the drug at the first opportunity. Failure to cure patients of this class by this irrational method has led a large portion of the profession to regard these wretched sufferers as hopelessly incurable, or as wilfully abandoned to a loathsome habit which they continued merely because they preferred to do so.

Another method which has been advocated by the more radical members of the profession was that of Levinstein. In this, without previous preparatory treatment, the opiate was discontinued at once, and when the vital forces began to fail, an effort was made to support them with alcohol and other such stimulants, with a final resort to morphine if the symptoms became too alarming. Both death and dementia have been recorded as the result of this inhumane undertaking.

The third, and by far the best of the older methods, was the rapid reduction or "Quick mode" of Erlenneyer. In this method the drug was reduced the first day to about one-third the usual quantity, and on each succeeding day the dosage was reduced until zero was reached by the fifth to the tenth day.

All of these modes of treatment were based upon the idea that the drug in the system was the first and principal thing to be contended with; in fact, that it was the sum total of the pathology. No treatment of any kind was given to prepare the patient for the withdrawal, none was thought to be necessary, but after the drug was withdrawn then the complications that arose were treated by various remedies, though in most instances these complications were so numerous and severe as to almost, if not completely, exhaust the patient, and often to force a resumption of the use of the drug. Among the more severe complications that occurred after the withdrawal of the drug by either of these methods may be enumerated, intestinal colic, nausea, vomiting, diarrhea, frequently assuming a dysenteric type and often proving uncontrollable without a return to opiates; rapid,

labored, inefficient or irregular heart action, collapse (sometimes proving fatal), extreme prostration, cold, clammy sweats accompanied by rigors, involuntary muscular contractions, cramps, hysteria of the most marked type, coryza, aching of the back, limbs and joints, extreme restlessness, persistent insomnia, general hyperesthesia of the peripheral nerves, burning sensations in the skin, especially in the back and feet; complete loss of appetite amounting in many instances to a loathing for food of all kinds, recurrence of the suffering for which the drug was originally used, maniacal delirium, sometimes proving to be permanent dementia.

It was often the case that some or many of these complications continued for weeks or even months, in spite of the most active treatment, only to yield when the physician was forced by their severity and exhausting character to resume the administration of opiates to save the life of the patient. All the old writers advised the symptomatic treatment of these complications as they arose, but made no effort to prevent their occurrence by ascertaining and removing their cause beforehand; in fact, they regarded them as entirely due to the withdrawal of the drug, and therefore unavoidable. With this formidable array of complications to meet, and with the gloomy prognosis given by the authorities, few physicians were willing to undertake the treatment of this class of patients. This left this unfortunate class of sufferers a most ready prey for a hoard of hungry nostrum vendors and charlatans.

Something over six years ago, Dr. George E. Pettey, now of Memphis, Tenn., having patients of this class in his clientele whom he was unable to cure by any form of the reduction method, and not being willing to allow them to drift into the hands of the irregulars, decided to make a thorough investigation of the treatment of the narcotic drug addictions. He says that after reading the available literature, he was convinced that the real pathology of this condition was not understood; that there was evidently another factor to be contended with besides the drug that was being used. In an effort to determine what this was, he says he laid aside all preconceived opinions and disregarded the teachings of the standard authorities and endeavored to forget for the time being that his patient was using a drug. In approaching the subject in this spirit, he found upon examination of the patient that there was marked evidence of the retention of excrementitious matter. The tongue was heavily coated, the breath foul, digestion deranged, bowels habitually constipated, etc. In studying the list of 21 or more principal complications that are recorded by the authorities as occurring upon the withdrawal of the opiate, he found that they could be divided into 4 principal classes, as follows: Those due to the derangement of the digestive tract; those due to derangement of the circulatory apparatus; those of nervous and mental origin, and those due to obscure causes, which he was then unable to determine.

In the first class, or those of intestinal origin, he placed these symptoms: Intestinal colic, nausea, vomiting, diarrhea and anorexia.

In the second class, or those due to derangements of the circulatory apparatus, he placed rapid, labored or inefficient heart action, extreme prostration, cold, clammy sweats and collapse.

In the third class, or those of nervous and mental origin, he placed hysteria, involuntary muscular contractions, cramps, general hyperesthesia of the peripheral nerves, burning sensations in the skin, recurrence of causal sufferings and delirium.

In the fourth class, or those of more obscure origin, he placed rigors, aching of the back and limbs, extreme restlessness, insomnia, coryza and a number of other symptoms which occasionally occur.

With this classification in mind, he set about trying to find some plan of treatment that would remove the cause of each of these classes of symptoms, and thus prevent their development, and to apply that

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remedy before withdrawal was begun, while the patient was still under the supporting influence of the drug he was accustomed to taking.

The first and most prominent indication seemed to be to empty the intestinal canal with the hope of avoiding the complications which had their origin in the derangement of that tract. Great difficulty was found in doing this as long as the opiate was continued. The strongest cathartics would not act with sufficient promptness to empty the bowel between the times for the doses of opiate and when a renewed quantity of the drug was taken, all activity of the bowel would be suspended. It was soon found that this was due to the suspension of peristalsis rather than to checking of secretion. In an effort to avoid this, strychnia was administered for the specific purpose of exciting peristalsis. Small doses made little impression because of the semi-paralyzed condition of the intestinal tube from the effects of the opiate, but as the doses of strychnia were increased, more active peristalsis was induced. By observing case after case and increasing the quantity of strychnia given with the cathartics, it was found that persons under the influence of opiates have a remarkable tolerance for strychnia, but that if 1-16 to 1-8 grain was given every 2 or 3 hours until at least 4 such doses were given, free peristalsis could be excited in spite of the benumbing influence of the opiate to which the patient was accustomed, and that, when peristalsis was thus kept freely excited, the purgatives in ordinary use acted as promptly and freely as they do on persons not under the influence of the opiates. This was the first, and has proven to be the most important step in the solution of this much-vexed problem. The quantity of excrementitious matter voided under such a plan was enormous and of the most offensive character, much of it showing signs of having been long retained. When the intestinal canal had been thus thoroughly emptied, it was found that the morphia could be withdrawn at once without the development of the symptoms classed as of intestinal origin; also that all other symptoms were very greatly modified, and that many of them were entirely absent. This was especially true of those due to derangement of the circulation. Neither collapse nor anything approaching to it was observed in any case after the intestinal canal had been fully emptied. In attempting to account for this, the conclusion was finally reached that these conditions were not due to weakened condition of the heart, as the older writers had thought, but to the obstructed state of the circulation, especially of the portal system, through which the heart was unable to throw the blood when deprived of the support it had been receiving from the opiate. But when this obstruction was removed, the heart had no longer to overcome that resistance, and was able to keep up the circulation without difficulty.

Having made this distinct advance toward the development of a rational treatment of these addictions by which the cause of the dangerous complications and those most difficult to control was removed, and their development prevented, and at the same time the suffering due to other annoying symptoms reduced more than 50%, the next step was to find a remedy that would overcome the symptoms of nervous and mental origin and those the origin of which was still undetermined. Various remedies were tried for this purpose, including bromides, chloral, cannabis indica, hyoscine, hyoscyamus, duboisin, atropine, hydrotherapy, electricity, etc. Some benefit was derived from all of these in different cases, but hyoscine proved the most useful, and, after becoming more familiar with its effects and mode of use, it was found to meet all the indications not met by thorough elimination.

After a period of clinical study of two years in which more than 150 cases were treated, Dr. Pettet announced the results of his investigations to the profession, with the following conclusions:

"Auto-toxemia is the essential pathology of mor-

phinism. When the system is freed from toxic matter and the portal system disengorged, morphine can be at once withdrawn without shock, collapse, heart failure, diarrhea or other dangerous symptoms, and the suffering incident to such withdrawal will subside within a few days' time without further treatment of any kind. This suffering, severe as it would otherwise be, can be avoided and these days passed in comfort by the discreet administration of hyoscine.

"All desire for morphine, as well as the necessity for its use, is overcome by such a course of treatment.

"Strychnia is an essential ingredient of any purgative course intended to empty the intestinal canal of a drug user. Without its liberal administration, sufficiently free peristalsis cannot be excited to empty the intestinal canal while the system of the patient is benumbed by the effects of the opiate. The administration of strychnia should be confined to the period of elimination and given for the specific purpose of exciting peristalsis, but should not be administered after the withdrawal of the drug, as advised by the old writers, because, at that stage, it keeps up too free peristalsis and inclines the bowel to empty itself too often. This interferes with digestion and assimilation, and causes diarrhea by the passage of incompletely digested food through the bowel."

In regard to the prognosis, he says that instead of these complications being uncontrollable and the morphine addiction hopelessly incurable, this plan of treatment renders it the most certainly and readily curable of all the chronic ailments.

During the last year the writer has had opportunity to verify every claim made for this plan of treatment by its author, and wishes to put on record the following cases treated by his method:

Case 1.—L. B. S. Morphine addiction of 3 years' standing. Was acquired by having morphine given to him to sober him after sprees of whisky drinking. These sprees continued to occur with increasing frequency, and in the course of a year the drug was taken daily. The dose was increased until, at the time of coming for treatment, he was taking 15 grains at a dose twice a day, by the mouth, but had not drank whisky for more than 2 years. Weight 150 pounds; height 5 feet 7 inches. Condition, fair for a drug user.

November 12, 1904—Began treatment by abstaining from dinner. 3 P. M., gave a capsule containing calomel  $2\frac{1}{2}$  grains, powdered extract cascara  $2\frac{1}{2}$  grains, powdered ipecac  $\frac{1}{4}$  grain, strychnia nitrate 1-16 grain, and repeated same at 5, 7 and 9 P. M., and at 5 P. M. gave 15 grains morphine. 9:30 P. M., gave vapor bath and high enema of saline solution.

November 13th—7 A. M., gave 1-15 grain strychnia hypodermatically. 7:30 A. M., gave one bottle citrate magnesia, and used vibratory massage for bowels. 8 A. M., very large movement from bowels, containing much scybala. 8:30 A. M., another very free movement from bowels. 9 A. M., it is now time for the patient to take his usual morning dose of morphine, but he is quiet and comfortable, and nothing is given. 2 P. M., bowels have moved 5 times since 8:30 A. M., the last two actions were very bilious. Patient slept most of the morning, but now says he feels uncomfortable, and wants something to relieve him. 2:10 P. M., gave 1-200 grain hyoscine hypodermatically. 2:40 P. M., gave 1-200 grain hyoscine hypodermatically. 3:40 P. M., gave 1-150 grain hyoscine hypodermatically. 4 P. M., patient says he is not suffering, but feels sleepy. 10 P. M., patient has laid in bed quietly for the last 6 hours, was drowsy but not asleep; pulse 78, respiration 18, temperature normal. 10:10 P. M., gave 1-100 grain hyoscine hypodermatically; about half hour later patient fell asleep and slept soundly for 6 hours; on waking said he was comfortable, drank water freely, and kidneys acted.

November 14th—8 A. M., patient has been awake for the last 3 hours; has sat up most of the time, but is now in bed; says he is not suffering any real pain, but is not altogether comfortable; gave 1-100 grain hyoscine. 2 P. M., patient's condition for the last 6 hours has been entirely satisfactory; has slept several short naps; when awake he laid quietly in bed and said he was not suffering in any way. 3 P. M., gave capsule containing calomel 2 grains, sodium salicylate 4 grains, and strychnia nitrate 1-16 grain, and repeated same at 5, 7 and 9 P. M. 10 P. M., gave 10 grains veronal.

November 15th—7 A. M., patient slept from 11 P. M. till 5 A. M.; on waking bowels acted freely, and have acted three times since 5 A. M., but actions were not free. 7:30 A. M., gave one-half bottle citrate magnesia, also 1-20 grain strychnia, the latter hypodermatically. 11 A. M., bowels have acted 3 times since 8 A. M.; actions not large, but very bilious; patient says he is entirely comfortable, except he feels weak; has no desire for morphine, but would like to have something to make him feel stronger;

gave glass of hot milk. 8 P. M., no medicine of any kind has been given since 7:30 A. M.; patient has passed a comfortable day; has taken a glass of milk every two hours since 11 A. M.; says he has some pain in back and legs, not severe, but thinks it would be sufficient to keep him from sleeping; has had slight temperature this evening, is now 100.5°; pulse 85, respiration 20; gave 7 grains aspirin. 10 P. M., temperature has fallen to 99°; is more comfortable; gave 7 grains aspirin. 11 P. M., has been in a moderate perspiration for the last two hours; temperature now normal; no pain anywhere; sleepy.

November 16th—8 A. M., patient has slept most of the time since midnight; was awake several times, but soon fell asleep again; says he is not suffering at all, and has no desire for morphine, but wants a big breakfast; was given bowl of milk toast; no medicine. 9 P. M., patient has passed a comfortable day, without medicine; has taken nourishment regularly; bowels have acted once, and kidneys have acted several times freely; temperature has been a little above normal for the last four hours, is now 98.3-5°; gave neutral bath, and half hour later 5 grains aspirin.

November 17th—8 A. M., patient did not get to sleep until midnight, but slept most of the time from then till 6 A. M., when he got up, took bath and dressed for breakfast; says he feels entirely well, but weak; went to dining room with other patients for breakfast.

November 20th—Patient has spent the last four days in comfort, without medicine, except an aspirin capsule at bedtime; temperature has been from two-fifths to three-fifths of a degree above normal each evening, until to-day it is hardly one-fifth above normal; aspirin discontinued, and neutral bath alone given at bedtime.

November 30th—Patient has made rapid progress toward entire recovery during the last ten days; no medicine of any kind has been taken; has eaten heartily, slept from four to six hours each night; bowels have acted two to three times each 24 hours, but there has been no approach to diarrhea, and there has been no other unpleasant symptom; says he feels as well as he ever did, and wants to get back home to his family. Discharged.

June 4, 1905—Patient reports under this date that he is in excellent health, and has been hard at work since January 1st; has felt no desire for either morphine or whisky.

Case 2.—Dr. T. T. S., aged 48. Weight, 140. Height, 5 feet 10 inches. Morphine addiction of 5 years' standing; daily quantity used, 20 grains, taken hypodermatically at 3 doses. Use of drug began for relief of sciatica, which has entirely disappeared.

November 25, 1904—Took Turkish bath and usual dose of morphine; no dinner or supper; gave capsule containing 2½ grains calomel, 2½ grains powdered extract cascara, ¼ grain ipecac and 1-12 grain strychnia nitrate at 4, 6, 8 and 10 P. M., and at 8 P. M. gave 8 grains morphine hypodermatically; last dose.

November 26th—7 A. M., gave 1-15 grain strychnia hypodermatically. 7:30 A. M., gave one bottle citrate magnesia. 8 A. M., very copious and offensive action from bowels; it is now time for the morning dose of morphine, but patient says he is comfortable yet, and can go for a while longer without it. 12 noon, bowels have moved several times since 8 A. M.; two of the actions were quite copious, and the others were of a bilious character; no nausea or other distress accompanied or preceded the action of bowels; slept between movements of bowels. 2 P. M., patient says he is beginning to feel the need of his dose of morphine; is yawning and sneezing, but not in pain; pulse 70, full and strong; temperature normal. 2:10 P. M., gave 1-200 grain hyoscine hypodermatically. 2:30 P. M., gave 1-150 grain hyoscine hypodermatically. 3 P. M., patient fell asleep, and slept three hours; on waking says he is not suffering, but thinks a dose of morphine would make him feel better. 6:30 P. M., gave 1-150 grain hyoscine hypodermatically. 8:30 P. M., gave 1-150 grain hyoscine hypodermatically. 8:45 P. M., bowels acted freely, very bilious discharge; soon afterward patient fell asleep, and slept until 1 A. M.; on waking says he feels quite comfortable.

November 27th—1:30 A. M., gave 1-150 grain hyoscine hypodermatically. 3:30 A. M., gave 1-150 grain hyoscine hypodermatically. 8:30 A. M., patient was restless for about an hour after the last dose of hyoscine, had delusions of sight and hearing, but says he is not suffering. 10 A. M., gave 1-150 grain hyoscine hypodermatically; slept two hours. 2 P. M., gave 1-150 grain hyoscine hypodermatically. 9 P. M., for the last 8 hours patient has been quite comfortable, says he has no pain anywhere, has had several dozing spells, but has not been asleep soundly; pulse 60, full and soft; respiration 16; temperature normal; skin moist, but not sweating; no action from bowels during the last 24 hours, but kidneys have acted freely; gave capsule containing calomel 2½ grains, sodium salicylate 4 grains, and strychnia nitrate 1-16 grain at 3, 5, 7 and 9 P. M.; also 1-150 grain hyoscine at 9 P. M.

November 28th—7 A. M., patient passed a comfortable night; slept 4 or 5 hours; had 3 liquid stools between 2 and 6 A. M., which were of a bilious character, and very offensive; no nausea or other distress; says he feels weak, but is otherwise comfortable; is hungry; gave 1-20 grain strychnia. 7:30 A. M., gave half bottle citrate magnesia. 10 A. M., bowels have moved 3 times since 8 A. M.; the last 2 were free watery actions, colored with bile, but not very offensive in odor. 11 A. M., gave glass of hot milk, which was taken with relish. 5 P. M., patient has taken 4 glasses of milk since 11 A. M., all of which have been

retained; no nausea, colic or other unpleasant symptom; has had 2 small actions from bowels during the afternoon, but no tendency to diarrhea; has been begging for solid food, but that has not been allowed; no medicine indicated, and none given.

November 29th—8 A. M. It has now been 84 hours since the last dose of morphine was given, 35 hours since the last dose of hyoscine, and 24 hours since the last dose of any other medicine was given; patient has spent a very satisfactory night, slept 5 hours, says he feels weak, but is not suffering; his circulation and respiration are normal, temperature is 2-5° above normal; his tongue is now clean, his breath has lost its offensive odor, the bronze muddy appearance of the skin has disappeared, and he says he was never as hungry in his life, but does not want morphine; no medicine, but a more liberal diet.

November 30th—9 A. M., patient was up and about his room most of the day yesterday; was given soft boiled eggs, milk toast and all the milk he wanted to drink, but no medicine; was tired when night came; went to bed early and slept 5 or 6 hours; he says he feels well, and certainly seems very happy since he realizes his independence of drugs; says he has no desire for morphine or any other stimulant; was put on course of physical training and liberal diet.

December 10th—It is now 15 days since the patient began treatment, and the last 10 days have been spent in comfort without medicine of any kind. Has slept from 5 to 6 hours out of each 24, is eating heartily, and gaining flesh and strength at a rapid rate. Bowels act regularly; has had no diarrhea or other complication. Has kept up course of physical training faithfully. Was allowed to go to the country to visit relatives for a couple of weeks.

December 26th—Patient returned from the country to-day. The improvement in his appearance and condition is most marked. The stooped posture which he had acquired while taking morphine has given way to one of erect carriage. Now weighs 160 pounds, which is a gain of twenty pounds since beginning treatment 31 days ago. Has kept up physical training regularly, and this has converted the newly acquired flesh into muscle; says he feels strong enough to undertake anything that he ever did in his life, and is anxious to get back to his practice. Being a man of intelligence and superior training, he felt his slavery very keenly, and resorted to many expedients, home treatments, etc., to free himself from it, but without success. Now that he realizes he is a free man, and has another chance in life, he says he is going to take up its duties with renewed energy and determination, and try to make up for lost time. Discharged.

June 1, 1905.—A letter from Dr. S. of this date says: "I am as well as I ever was in my life, and am doing as hard work, with as much satisfaction. I continued to gain flesh after leaving you, until I weighed 180 pounds, which was 5 pounds more than I ever weighed before. I have had no occasion to take medicine of any kind since leaving you, and if I had I certainly would not have taken an opiate. In fact, I never think of morphine except as the most blighting curse on earth. I can hardly realize now that a little over six months ago I was almost as dependent on it as I was on the air I breathed. My whole experience with it seems as a horrible nightmare to me. No language can express my gratitude to those who released me from that abject slavery."

"I feel that I should not close without commending your course of physical training. It seemed unimportant to me at the beginning, but it was the very thing I needed. After being taken off of the drug, my tissues were flabby and relaxed, and I was weak in every way. The training course enabled me to acquire a fund of reserve physical force that has been worth everything to me. I am able to stand the strain of the heaviest day's work without feeling the need of stimulation. I believe that your course of physical training is the most effective means of preventing relapse in these cases that can be devised."

After the treatment of a series of 30 cases of drug addiction by this method I am convinced that results very closely approaching, if not equally as satisfactory as the above can be obtained in almost every case where the patient's condition is at all fit for treatment, and where the coöperation of the patient can be had. If a patient is subject to recurring attacks of hepatic or renal colic or other such painful ailment, it is useless to attempt to cure the addiction unless the plan also includes a radical surgical procedure or other means calculated to remove the cause of the pain. In such cases the most satisfactory results may be obtained by having the patient operated upon soon after the treatment for his addiction has been completed and before he is called upon to pass through the suffering of another attack of colic or other painful ailment to which he is subject.

As a rule, the community does not appreciate the value of services, whether medical or surgical, because it fails to realize in the least degree the burden of care placed on the physician and on the surgeon.